Reminiscing Systems: Let the Good Times Roll?

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ABSTRACT
The purpose of this workshop paper is to examine the area of reminiscing and assess its potential as an area of opportunity for research. Reminiscence activity is commonplace as an activity that is widely recognised as beneficial to people with dementia. It also offers alleviation of the burden of care for those who look after people with this disease. In reminiscence activities, people are presented with photographs representing their lives, in some form. Reminiscence systems are simply the use of technology to support reminiscence work. The research approach is to scope the extant work in the area, establish method, and discuss the study design and methodological aspects. The ambition is to formulate a research framework in order to develop and assess reminiscence systems and aspects of visual narrative with users.

Categories and Subject Descriptors
H.5.2 User Interfaces (D.2.2, H.1.2, I.3.6)

General Terms
Design, Human Factors

Keywords
Reminiscence systems, reminiscing, assistive technology, reminiscence therapy, reminiscence work, reminiscence activity

INTRODUCTION
Across the world, a large body of people constitute the 'baby boomers' of the post World War II era. As these baby boomers begin to retire, their numbers are swelling and creating significant strategic issues for healthcare systems. The general response at policy level to this demographic ageing or the 'greying' of the population is a move to self-care where possible, as well as supporting 'ageing in place' where the older person can receive care at home, in the supportive circle of family and friends. However, many of these people may not have opportunities for social contact, even at home, and as such potentially face a degree of social isolation. The paper outlines work in support of reminiscing, which is recognised as an activity that provides benefit to, for example, people with dementia. The activity also is of benefit as a therapeutic intervention to this group and is recognised as beneficial also to the wider older population. As we age, we gather a large number of life experiences, many of them signifying important life stages, for example, as our family grows, as we impact on the world, and as the world impacts on us. An old photo, of sentimental value, can mean everything to a person, becoming imbued with tremendous significance and often-talismanic importance. These artefacts, whether a location, person or event, or indeed a photo of such an artefact, become the stuff of reminiscing, fuelling what is viewed as a therapeutic process, that, when managed, offers benefits [12,19], but can reinforce feelings of isolation and depression when unmanaged. As people age, they also increasingly face old age alone, especially in developed economies, as the demography of the post-war (1939-45) period is realised in societies today. The baby boomers of the post-war period are now at or past retirement age, and this increase in numbers of older people results in a significant strain on social and health services. It is projected that by 2025, over 70% of UK households will comprise of people living alone, where a majority will be elderly people. This large body of people, each of whom may have gathered many sets of memories as photographs, has no real facility to use material for reminiscing or share these and to enjoy the therapeutic benefit arising from sharing.

Reminiscing includes a range of activities and traditional tools aimed at stimulating thoughts, feelings and memories of times gone by. For example, these could be recalling significant cultural issues, events, old friendships or places. Reminiscing can help elderly people to improve their own health and wellbeing. In scientific literature, the impact of reminiscing therapy as an intervention has been demonstrated for a range of populations, but primarily for people with dementia.

In this position paper, the issue of reminiscing is explored. As a social phenomenon, reminiscing offers social benefits and brings communities together while discussing personal and historical issues of relevance to the participants. However, as, for example, older people may lead increasingly isolated lives, there is a risk that they are excluded from the opportunities to engage socially in activities and acts such as reminiscing, without the effective employment of technology to support the acts. The key question being asked is should the act of reminiscing be supported using information and communications technology (ICT)? The position taken in this paper is that the reminiscing act benefits from use of ICT.

REMINISCENCE
Reminiscence has been defined as a 'process of thinking or telling others about one's past experiences' [5]. As a

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therapeutic intervention, reminiscence is 'using the recall of past events, feelings and thoughts to facilitate pleasure, quality of life, or adaptation to present circumstances' [8]. Reminiscence therapy is generally based one of two theoretical perspectives, Erikson's theory of psychosocial development or Atchley's continuity theory. Erikson's theory emphasises 'achievement of ego-integrity and a sense that one's life has meaning and significance, which can be fostered through reminiscence' [3,24]. Continuity theory, on the other hand, 'emphasises adjustment by clients to maintain continuity in internal (self concept) and external (social behaviour and social interaction) structures' [2]. Reminiscence is seen as an attempt to maintain continuity between past and present through recall of 'familiar knowledge, skills and strategies' [14]. Reminiscing includes activities and the use of traditional prompts aimed at stimulating feelings and memories; e.g., the use of multi-sensory triggers to stimulate recall [10]. The majority of research in reminiscence systems has been carried out to assist people with dementia and related illnesses [1,20]. The impact of reminiscing therapy as an intervention has been examined; e.g., Wang [24] demonstrated how it was valuable and beneficial to people with dementia although Woods et al [25] found inconclusive evidence of the efficacy of reminiscence therapy for dementia in a Cochrane Review. However, it has been shown that reminiscence in general, but especially life review, are potentially effective methods for the enhancement of psychological well-being in older adults [4] and the therapeutic potential of place-based reminiscence has been proposed as an avenue in enhancing the quality of life for older people in long-term care facilities [6], sometimes using remote reminiscing facilities [13].

REMINISCENCE SYSTEMS

The easiest way in which to describe reminiscing and how ICT supports reminiscing activities is to review some of the systems from research literature as well as systems in use. Reminiscence systems have been defined as the use of technology to support reminiscence work [15]. The use of multimedia in reminiscence systems was arguably the first stage in the growth of research in reminiscence systems supported by ICT, and there are a significant number of research projects and publications highlighting such work [16]. It is natural, perhaps that reminiscing work, which uses visual and hearing senses (as well as other senses) could be enriched with multimedia material encompassing photographs, videos, audio recordings, music as well as historical material from newspapers, for example. The multimedia paradigm also lends itself to extending the concept of memory books, used in traditional reminiscence work, where a carer or family member compiles a personal scrapbook with images and pictorial mementos of a person's life. Using multimedia, the reminiscence systems can animate the material thus making it more attractive and attention holding than a paper-based scrapbook. However, since the process of creating a memory book is itself a process rich in reminiscing opportunities, care must be taken not to replace this type of work with a more mundane and less user-centred multimedia authoring process.

In order to make reminiscence systems as accessible as possible for reminiscing by people (and their carers if relevant), the interface of such systems must be as usable as possible. This is particularly important where the user is not a computer user normally and/or for when the system has to provide cognitive support, for example to people with dementia. Touch screen devices are becoming increasingly used in reminiscence systems for people with dementia as the primary mode of interaction, obviating the need for mouse and keyboard combinations. Touch screen devices, used as a direct input device have been highlighted as requiring little or no training for users [17]. Arguably the next opportunity in reminiscence systems research and development, building upon touch screen access to computers with rich multimedia content, is the potential for the Internet to create new ways for reminiscing to be supported. It may be argued that bespoke, standalone reminiscence systems will be replaced by highly networked systems that source multimedia material from the 'web 2.0' computing 'cloud' of User-Generated Content (UGC), where 70% of total web content is envisaged to be generated by users in the next few years, on sites such as Flickr[1], Vimeo[2], YouTube[3] and using Application Programming Interfaces (API) to social networking sites such as Facebook. One such system for reminiscing to the broader public using social media for public reminiscence and recall of past events was used to engage people in reminiscing activities using emails linking to social media content. The research found that users valued the system and that prompts with images interestingly drew more responses but less thoughtful ones than textual prompts [7].

In terms of social media, existing social networking sites such as Facebook can support reminiscing interactions using specialised applications or 'apps'[4]. There are also emerging social network sites that cater specifically for older people. These include Sagazone[5] and Finerday[6] in the UK. It is unclear if they support specific reminiscing activities, but a part of their attraction is in bringing older people together in a social network, and supporting their interactions. While not explicitly supporting reminiscing, the MyHeritage[7] site is a social networking application that is strongly orientated to linking family members, in support of sharing experiences. In 2009, it held over 550 million individual profiles, over 14 million family trees and 81 million photographs. There are many other mainstream applications and systems that are related to reminiscence systems. For example Loopt[8] is a location-

[1] http://www.flickr.com/

[2] http://www.vimeo.com/

[3] http://www.youtube.com/

[4] http://www.facebook.com/apps

[5] http://www.sagazone.co.uk/

[6] http://www.finerday.com/

[7] http://www.myheritage.com/

[8] http://www.loopt.com/

based service that supports interactions based on geographic position, while LIFEmee[9] is a Japanese life-logging system that aggregates your daily life media into an interface that facilitates the sharing of that media and annotations with others. In a similar vein, Evernote[10] is a kind of 'digital shoebox' service where information, photos, etc can be added and then made available to others. Perhaps the application that is most clearly an application that can support reminiscing is MemoryMiner[11]. This is an application where photographs and other visual material can be added to a repository, annotated and then published to the Internet where further annotations can be made to the material. More tangentially related to reminiscence systems is perhaps the EntityCube technology from Microsoft[12], which seeks to find the linkages between different individuals and - when it works - is empirical evidence of the six degrees of separation concept. Increasingly, mainstream applications such as Apple's iPhoto are incorporating face recognition technologies that assist in compiling photo albums automatically.

USERS

It is clear that the numbers of older people are increasing rapidly in coming years, and that reminiscing activities offer a social benefit to this group of older people as they age. Technology continues to be adopted and utilised across many areas of society and there is evidence of continued uptake of ICT by older people to assist them in their daily life activities. Therefore it is valid to take a position that the act of reminiscing can be supported by ICT, and that using ICT to support and extend the capabilities of reminiscing activities offers a wide social benefit.

However, older people's attitude to ICT is different to the attitude of the wider population and is widely divergent from the attitude of the technologically savvy younger generations. In a 2006 research report on the attitude of older people to TV, radio, the Internet and mobile/portable devices, the majority of older people were classified as reluctant participants, that is, 'abstainers' or 'resistors', where around 74% of over 65s were either resistors (32% c/f 21% of UK adults) or abstainers (42% c/f 11% of UK adults) [21]. Of course, while the majority of older people may be characterised as resistors or abstainers of technology, older people are also embracing some technologies such as digital cameras. Using digital devices with their computers can eliminate many of the issues with traditional photograph storage and use, can make indexing and finding particular images much simpler, and can facilitate sharing of such media much more easy to achieve. As well as having differing attitudes to technology and technology use from the wider population, older people may also have issues with usability and accessibility arising from the impact of age on their senses, primarily on hearing (hearing loss), eyesight (decline in amplitude for ocular accommodation) and cognitive abilities (decline in power of recall, for example), but also on physical dexterity, where, for example, grip strength declines with age. The number of people suffering from chronic diseases increases with age and many of these diseases impact on the ability of a person to use a particular modality of interaction with technology; for example, a person with Parkinson's disease which causes tremors in hand movement or a slowing of physical movement generally, may not be able to interact well with a touch screen interface. There is also a significant difference between the youngest old (55+) and the oldest old (80+) across these three areas of attitude to technology, age impairment of senses and cognitive and physical ability, and impairment due to impact of chronic disease.

If the reminiscing act is supported by technology, then how can it support this group of people, each of whom are old but all have very different needs, requirements and attitudes due to their particular situation? What design decisions would need to be taken for a reminiscence system in order to accommodate such different needs? For example, in the CIRCA system [1], designed for people with dementia, the system has been designed to be 'failure-free', meaning that there is no obligation for the user to complete any task or to navigate to a particular screen. CIRCA was designed to provide an 'intuitive, expansive and fail safe reminiscence experience, utilising contemporary computer touch screen technology and interactive media design to assist people with dementia and their carers and relatives in prompting conversation in one on one or group situations' [11]. The Potential Support Ratio (PSR) is the ratio of the number of 15-64 year olds who could support one person 65+ (retired). In the UK in 1950 the PSR was 12:1, in 2000 9:1 and it is projected to be 4:1 by 2050 and 2:1 in the developed world [22]. There is also, then, an impending crisis in terms of the burden facing formal and informal (families, neighbours and friends) carers. The acts of reminiscing, supported using ICT, must also then support the carer of the older person, if necessary, and alleviate their care-giving stress or burden. This is particularly important as the number of people with dementia, estimated at 35.6 million people worldwide, is forecast to be 65.7 million in 2030 rising to 115.38 million in 2050 [18].

In summary, then, older users are a complex, heterogeneric grouping, with different needs and characteristics, where physical, cognitive and sense impairment is typically accelerating in old age, and where propensity to suffering from chronic disease is increasing.

EXPLORATION

We believe that there are three main modalities of use for reminiscence systems. Firstly, the use of a reminiscence system by an individual; secondly, more than one person (may be a person and their carer, for example) sharing reminiscences in the same physical space; and thirdly, shared reminiscing where people are physically remote

[9] http://www.lifemee.com/

[10] http://www.evernote.com/

[11] http://www.memoryminer.com/

[12] http://entitycube.research.microsoft.com/6du.aspx

from each other but inter-connected by the Internet. In order to explore how the reminiscing act may be supported by ICT in these three modalities, several experiments are being designed. The methods for these are set out below, and broad topics include:

- Examine act and activities of reminiscing, in particular our understanding of reminiscence;
- Explore the affordances of existing artefacts used in reminiscence, and the way such artefacts are used in conversation;
- Carry out ethnographic work with older people;
- Establish reminiscence needs identification for older people;
- Develop a user-friendly visual computer system designed to be used by older people for purposes of reminiscing;
- Develop evaluation frameworks using WHO QOL and/or PIADS [9] for system in use, as appropriate;
- Assess value of different types of multimedia information (photographs, film, generic media, person-specific media, or 'shared experience' media); and
- Evaluate ease of organisation and change of media by older people, people with dementia and caregivers.

The project is designed to engage with older people (> 55 years) at two sites in Northern Ireland, one rural and one suburban. The study will engage with four individuals on each site at any one stage, gathering responses and viewpoints from up to 40 individuals. Group sessions will also be used to gather consensus feedback on the reminiscing system. A control group will also be used in the study, with a card set of images used as a control. The project will use qualitative techniques to gather perspectives on a reminiscing system, using ethnographic techniques to capture responses. The project will make use of touch screen computers (Apple iPads) running a bespoke application designed specifically for the study. Apple iPad provides a 9.7-inch multi touch-screen, which will increase the usability of the system for users with large fingers or weak vision. The reminiscing system and the control images will comprise three kinds of images: personal, generic images (for example, a birthday cake) and images that reflect 'shared experiences'. Research has shown that the function of photographic-based images as memory aids, or as stimuli for reminiscing, can be placed in the context of the narratives that can be constructed around the image [26]. Personal memory that relates to cultural memory should be considered, such as how the 'objects of memory' can be drawn upon and how they are recounted. Personal images will be gathered from an interview stage with the subjects. These will then be digitised and compiled into both the application and the memory book. A set of generic images will be defined and used, and images that reflect shared experiences from Northern Ireland of days gone by will be gathered. The Reminiscence Network of Northern Ireland will provide guidance and support in developing these materials. After the participants use the reminiscing system and card images, they will have an opportunity to voice their experiences. This interview will be recorded by video, as will the all group sessions. The qualitative data will then be analysed using NVIVO[13] or equivalent, while the explicit and implicit usage data will be analysed statistically.

CONCLUSIONS

This paper has described reminiscence, and how ICT can support the activities of reminiscing using reminiscence systems. It has provided a review of related work in the area of reminiscence systems, including commercial systems. The different types of technology supporting reminiscence work are described from the use of multimedia and touch screen technology to the growing importance of UGC and Internet-connected systems for reminiscing. The characteristic type of person who takes part in reminiscing has been described in terms of their age, abilities and attitude to technology. Three modalities of use for reminiscing systems have been outlined, and a proposed exploration path is described. In this work, the intention is to carry out research with users of a bespoke reminiscence system and to evaluate the findings from the study. The modality of use is a single individual using a system, but group sessions may be used to gather consensus feedback on the system. The benefits in developing reminiscence systems are that systems offer many benefits in ease of use, sharing of photographs and other media, as well as alleviating the burden of care with informal or formal caregivers, if appropriate. The risks in adopting such technologies are that the essence and richness inherent in such a human activity as reminiscing are lost in translation.

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Outline

- context
- role of technology in support of reminiscence
  - academia
  - commercial
- discussion
- art of memory project
- concluding remarks

context

reminiscing

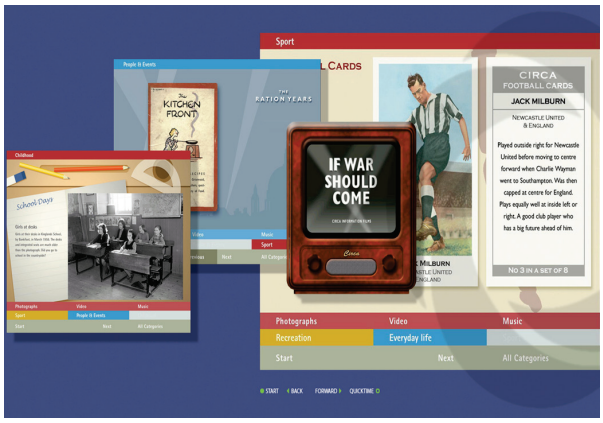
- reminiscence has been defined as a:
  - process of thinking or telling others about one's past experiences
  - using the recall of past events, feelings and thoughts to facilitate pleasure, quality of life, or adaptation to present circumstances
- Has a therapeutic role
- reminiscence systems
  - use of technology to support reminiscence work
- role in "Mental health care and rehabilitation"

role of technology in support of reminiscence - academia

CIRCA 2001-2004

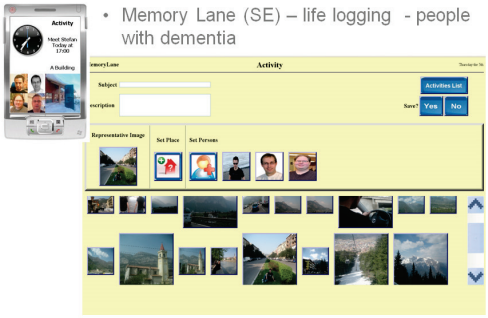
- Computer Interactive Reminiscence and Conversation Aid
- Aim: support communication between people with dementia and caregivers
- Uses interactive multimedia technology to minimise working memory problems whilst leveraging well-preserved long term memory
- Being commercialised by Dementia Life

Alzheimer Scotland Action on Dementia
Dundee City Council Home Page
EPSRC Engineering and Physical Sciences Research Council
University of St Andrews
University of Dundee



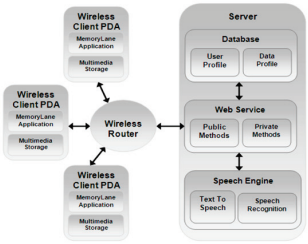
related work – MemoryLane (SE)

- Memory Lane (SE) – life logging - people with dementia



related work - MemoryLane

- MemoryLane, older people, constructed memory stories, pda based



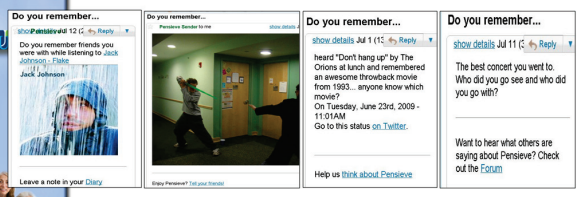
related work – NM2

- NM2, Storytelling, reminiscing

Liam Reilly "There's a story ... I'm not sure if it's true or not, but several people have told me ..."

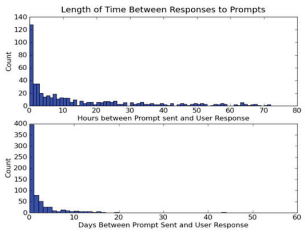
related work - Pensieve

- Pensieve, general population, prompting reminiscences



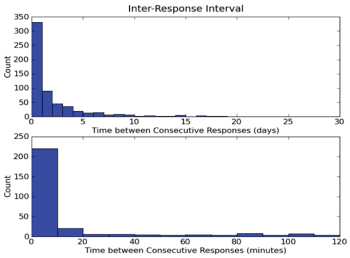
Example memory trigger emails from last fm, Flickr, Twitter, and the non-personalized text prompts.

related work - Pensieve



Time between receiving a trigger and responding to it. If people respond to triggers, they generally do shortly after receiving them.

related work - Pensieve

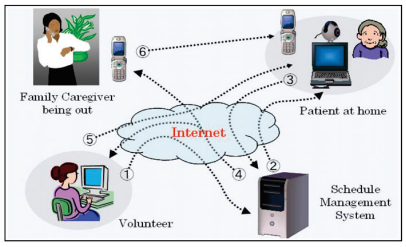


Time between diary entries by the same person. Most people who write, write regularly (top);

writing is also often bursty, with people responding to multiple triggers within minutes (bottom).

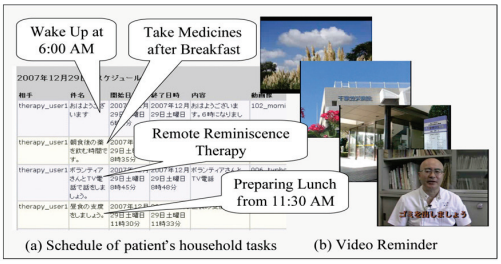
related work - Kuwahara

- Kuwahara et al, people with dementia, prompting



related work- Kuwahara

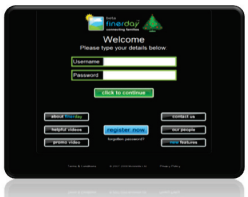
related work - Kuwahara



role of technology in support of reminiscence - commercial

18

social networking platforms



SagaZone (www.sagazone.co.uk/)
Finerday (www.finerday.com)

social networking platforms

www.facebook.com

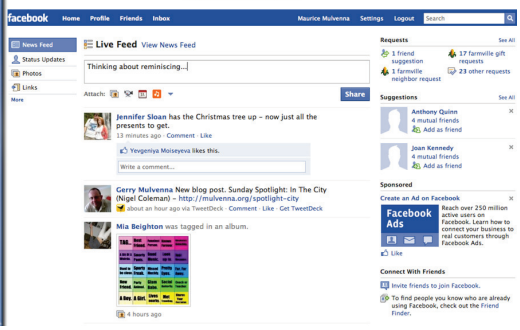
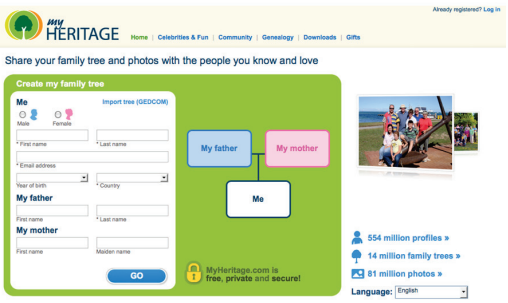


photo books

iphoto (www.apple.com/ilife/iphoto)

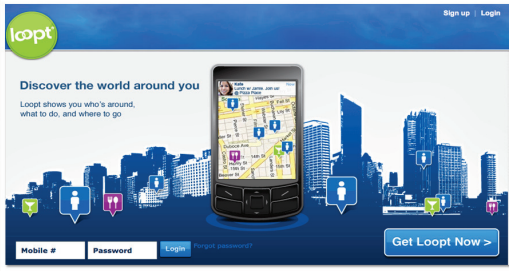
21

MyHeritage.com



22

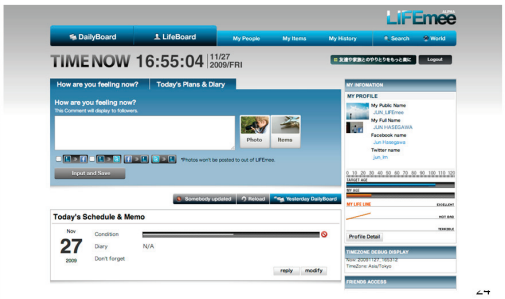
location based services



www.loopt.com

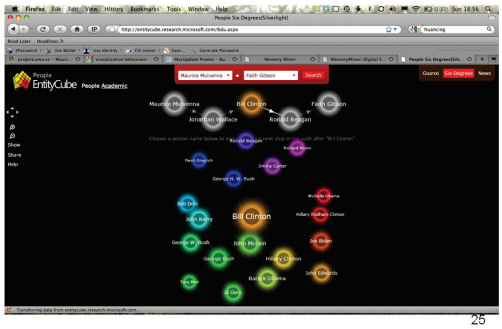
life log

LIFEmee (lifemee.com/)



Entity Cube

http://entitycube.research.microsoft.com/6du.aspx



25

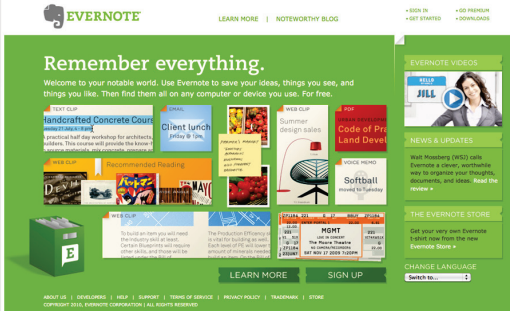
MemoryMiner

www.memoryminer.com/

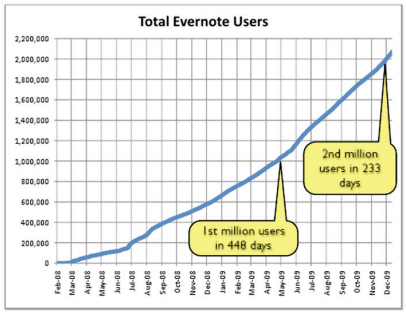
26

Evernote

www.evernote.com



Evernote



28

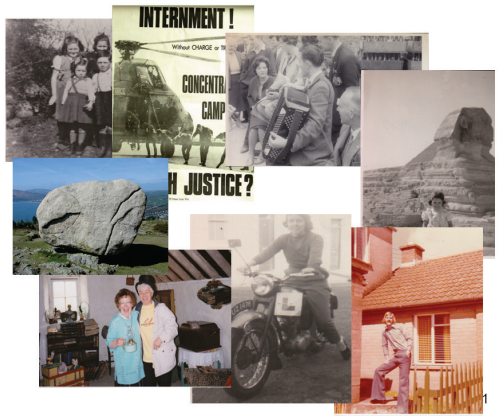
art of memory project

29

Art of memory

- "To Encourage the Translation of Research Findings into Products and Services that will have an Impact upon the Economy and Society"
- Aims
  - Assess value of different types of multimedia information (photographs, film, generic media, person-specific media, or 'shared experience' media); and
  - Evaluate ease of organization and change of media by older people.

30



- Three types of images used in this study: personal images belonging to the participants, generic images of life events and shared experience images. So for example, a generic image may be a guitar, a shared experience image may be a picture of Elvis Presley, while an example of a personal image in this context may be a photograph taken at a dancehall, involving the participant.

Art of memory

- Hypothesis 1 – participants will spend more time on personal images than shared experience or generic images
- Hypothesis 2 – participants will enjoy using device more than traditional photographs

Likes

Like about device	Like about traditional images
Easy to use, tidier than paper	Cards can be handled around friends
Images don't get desytroyed by handling	Could hold it in any hand
Kept all images togather	
Ease of use	Photographs are handy
Ease of use	Handle images and look at full image closer
Exciting	
Ease of use, image quality	It is more personal
It is immediate	Being able to hold them
Very handy and quick	Not great with new technology
Very good, ease of use	

discussion

technologies

current
- social network platforms
- photo management
- location based services
- life logging
- (auto)-constructed narratives

projected
- user generated content
- immersive (3d)
- automated connecting
- autonomous agents

cognitive engineering

- supporting
- involving
- prompting
- stimulating
- entertaining
- storytelling
- creating
- economising
- simplifying
- moderating
- contextualising

37

2010 European Year for Combating Poverty and Social Exclusion

University of ULSTER
A University of Ulster Innovation Lab

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Member of European Network of Living Labs

WORKSHOP DISCUSSION

[Willem-Paul Brinkman] You seem to focus on mainly on pleasing memories, have you also consider supporting the remembrance of traumatic events?

> [Maurice Mulvenna] You have to be careful with this. Some research suggests that personal images could trigger negative memories, we therefore use more generic images.

[Willem-Paul Brinkman] You mention that using these cards in a therapeutic manner, could you explain what would this improve?

> [Maurice Mulvenna] Now they use cards to trigger memory in their long term memory. This could trigger a discussion with family members or care givers. Technology helps to bring the photo more to life. Some people with dementia could become very aggressive. Reminiscing could help them to calm down. Also reminiscing as an activity can help to establish a pattern in their daily life as some of them might have problems getting out of bed or sleeping in the evening. For the care giver, it also helps them to see the person as real individual, which could improve their social interaction.

[Charles van der Mast] Do you know about psychological and other (perception) theories and experiments on how reminiscing may work in specific situations and domains? (to learn from it)

> [Maurice Mulvenna] No, I do not know. We are aware that there is a lot of work in this area, describing memories but we have focused on attitudes of people.

[Mario Conci] 1) technology can be used to elicit memories that are not actually true, but that can have a positive effect on patient with dementia. What are the ethical issues implicated with this? 2) what's the risk related to this kind of automatic reminiscence? that is, people don't have the control on their memories but the system decides what is good, bad, true and false...

> [Maurice Mulvenna] A 1) Well, I do not think that there are two many problems with this ethically. You cannot mandate what a person choses to share or reflect is a memory even if it is not real or true. A2) the reminiscence system we are researching does not 'decide what is good bad etc" rather we asked ageing people to select personal images which we then mixed with 'generic' ones and also some images reflective of 'shared experiences' usually culturally. These, then, are the library of images that the participants reflect upon and reminisce on. IF however, you have a hypothetical system, where a person may be shown images that the person is being told are their own memories, then that is a very different matter.